County of San Diego Department of Planning and Land Use

Assumptions Used for Calculation of Water Offset Credits

The amount of water credit (in acre-feet/acre) to be granted for land with an actively irrigated use that will be permanently taken out of production is listed for the most common vegetation types in Borrego Valley:

Vegetation Type	Groundwater Offset Credit (acre-feet/acre/year)
Citrus (all types)	4.6
Nursery plants	4.2
Palms (all types)	3.5
Tamarisk	1.6
Turf (warm season)	4.7
Turf (winter cool/summer warm)	5.2

This was determined by the following equation:
Annual Groundwater Consumptive Use (acre-feet/year) =
[Reference Evapotranspiration (feet/year) x Plant Factor x 1 acre)] / Irrigation Efficiency

Where:
Annual Groundwater Consumptive Use (acre-feet per year), defined as the amount of groundwater lost through evapotranspiration (evaporation from the soil and transpiration from the plant).

Reference Evapotranspiration (ETo) (feet per year), defined as the approximation of water loss from a field of 4-to-7-inch-tall cool season grass that is not water stressed. ETo values are published by the California Irrigation Management System (CIMIS). For the calculation, please use the most currently published average annual ETo from CIMIS Station 207 in Borrego Springs. As of May 18, 2011, Station 207 had an average annual ETo of 6.3 feet (source for ETo: http://www.cimis.water.ca.gov).

Plant Factor (or Crop Coefficient), defined as the fraction of water lost from the plant relative to ETo. The annual plant factor is listed for the most common vegetation types in Borrego Valley:

Vegetation Type	*Plant Factor
Citrus (all types)	0.65
Nursery plants	0.6
Palms (all types)	0.5
Tamarisk	0.2
Turf (warm season)	0.6
Turf (winter cool/summer warm)	0.66

*Plant factor for other plant types shall be obtained from publications by the State of California or University of California
Sources for Plan Factor: http://www.water.ca.gov/pubs/planning/guide_to_estimating_irrigation_water_needs_of_landscape_plantings_in_ca/wucols.pdf
http://celosangeles.ucdavis.edu/newsletterfiles/Co-Hort11051.pdf

Irrigation Efficiency, defined as a measure of the portion of total applied irrigation water beneficially used to satisfy the plants needs. Losses (non-beneficial use) include runoff, evaporation from wet soil surfaces, and irrigation return flow to the aquifer. The numbers below were adjusted to take into consideration the assumption that 10% of the total applied water is irrigation return flow back to the aquifer.

Irrigation Method	Irrigation Efficiency
Spray/Rotor (turf, tamarisk)	0.8
Drip (Citrus, nursery plants, palms)	0.9

Source for Irrigation Efficiency: Turf and Landscape Irrigation Best Management Practices, April 2005, Water Management Committee of the Irrigation Association